

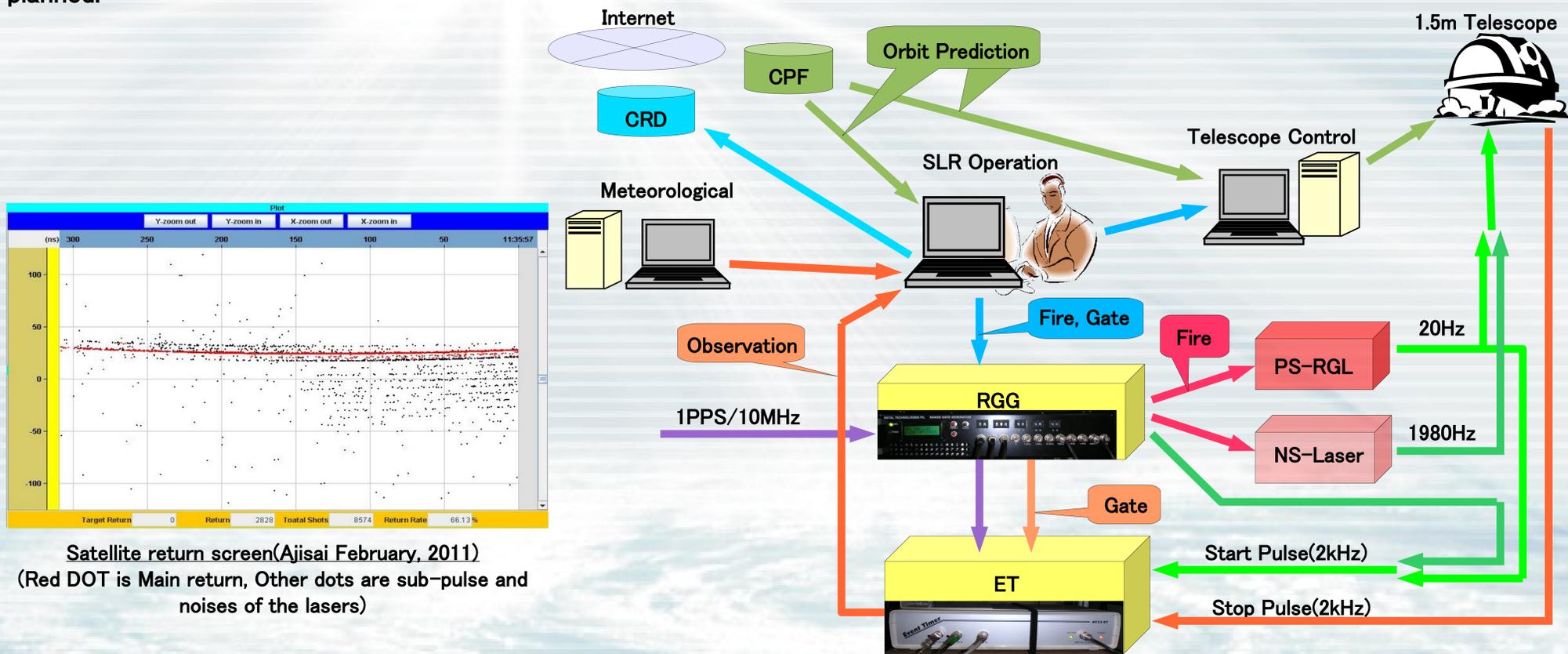
# Software and operational status of Koganei kHz Ranging Engine (KRE)

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**Abstract**

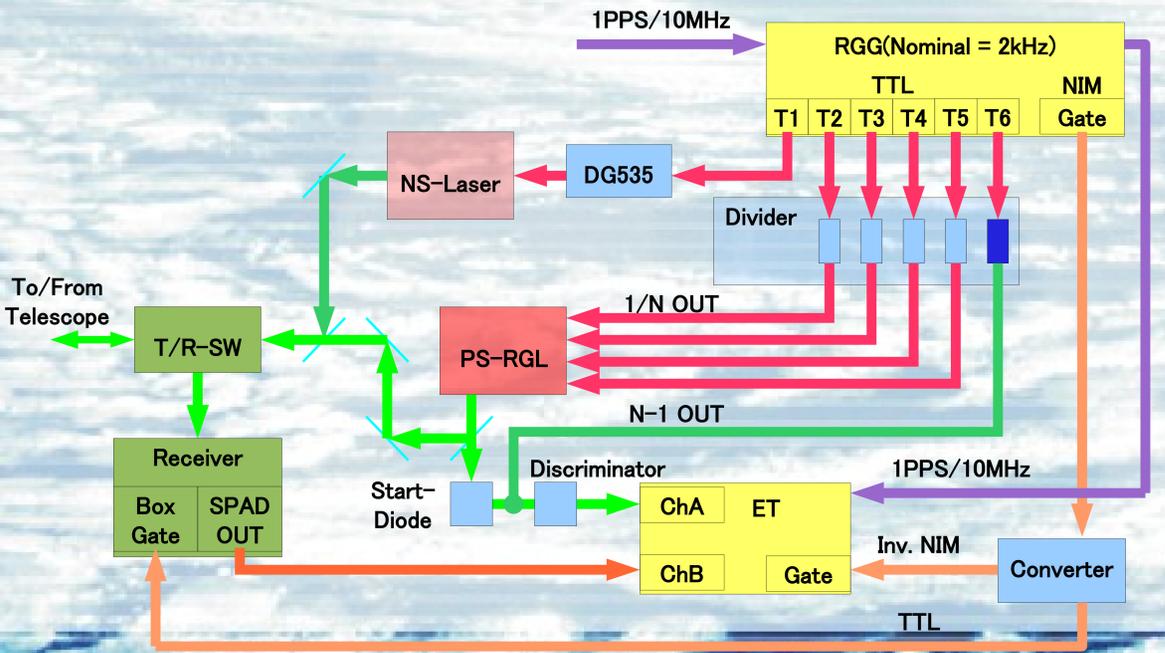
We have developed KRE system to get clear Hardware and Software interface for enhanced applications such as LLR and T2L2 from the present SLR system. KRE consists FPGA based Range Gate Generator(RGG) and Event Timer(ET) of the product made in Latvia. Time and frequency input to KRE is the standard 1PPS and 10MHz from clock source of the sites, which is selectable between UTC-NICT and GPS. Software integrates the controls and monitoring of RGG, ET, laser and meteorological subsystem. A nano second pulse width 2kHz, 10W laser is introduced and will be combined with the existing pico second laser of 20Hz, and the ranging of the moon by higher power is planned.

Acronym	Description
CPF	Consolidated Laser Ranging Prediction Format
CRD	Consolidated Laser Ranging Date Format
RGG	Range Gate Generator
ET	Event Timer
PS-RGL	20Hz Picosecond Laser
NS-Laser	2kHz Nanosecond Laser(It's introducing it)

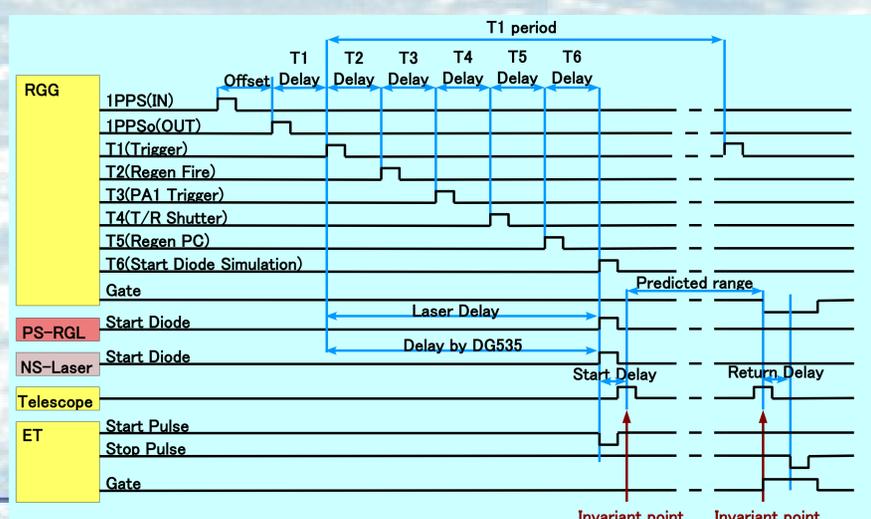


Satellite return screen(Ajisai February, 2011)  
(Red DOT is Main return, Other dots are sub-pulse and noises of the lasers)

**KRE System structure**



Signal Distribution at synchronous operation of 2kHz-Nanosecond Laser and 20Hz Picosecond Laser



Timing chart of RGG to 2kHz-Nanosecond Laser and 20Hz Picosecond Laser